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09/847,308	05/03/2001	Yasuyuki Arai	740756-2312	5435

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EXAMINER

CLEVELAND, MICHAEL B

ART UNIT	PAPER NUMBER
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1762

DATE MAILED: 02/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/847,308

Applicant(s)

ARAI, YASUYUKI

Examiner

Michael Cleveland

Art Unit

1762

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 23 November 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-55 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-55 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 082605, 112305
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Claim Interpretations***

1. The term “small molecule” is understood in the art of organic electroluminescence (EL) devices to refer to non-polymeric organic materials, such as Alq<sub>3</sub> (See, e.g., Gu et al. (U.S. Patent 5,844,363) col. 1, line 64-col. 2, line 6).

2. The term “goggle-type display” in claims 9-12 is interpreted in light of p. 20, lines 11-12 as inclusive of any head-mounted display. See also Fig. 7D.

The phrase “at an atmospheric pressure” in claims 17-20 and 51-55 has been interpreted in light of the specification (e.g., p. 6, lines 9-10) as requiring a pressure of approximately 1 atmosphere ( $1.01 \times 10^5$  Pa).

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-8, 13-16, 34-35, and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis et al. (U.S. Patent 5,902,688, hereafter ‘688) in view of Onitsuka et al. (U.S. Patent 6,049,167, hereafter ‘167).

Claim 1: ‘688 teaches a method of manufacturing a light-emitting device, comprising the steps of:

placing (i.e., filling) an organic electroluminescence (EL) material into a crucible (i.e., an evaporation cell) (col. 9, lines 15-25; Fig. 10); and

heating the organic electroluminescence material to form a patterned light emitting layer (109, 110) on a substrate (103) (col. 5, lines 55-67; col. 6, lines 33-51).

‘688 teaches that the evaporation occurs under vacuum conditions (col. 9, lines 15-17), but is silent as to the atmosphere. Therefore, it does not teach that the vacuum atmosphere

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should be an inert gas. '688 seeks to solve the problem of degradation of the material by oxidation during processing (col. 2, lines 28-49).

'167 also teaches a method of manufacturing organic EL devices and is also concerned with the degradation of the EL layer (In this case by the effects of moisture) (col. 1, lines 10-32). '167 also teaches that the layers may be deposited by vacuum evaporation (col. 12, lines 31-67) and teaches that the EL layer forming steps in the presence of an inert gas (Abstract). '167 does not explicitly teach that the evaporation source is an organic EL material filled into a cell.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have performed the vacuum deposition of '688 in the inert gas of '167 because '167 teaches that organic EL layers may be deposited by vacuum evaporation in inert gas, and further because '167 suggests that the use of inert gas avoids degradation that would have been experienced using moisture-containing atmospheres.

Claims 2 and 4: '688 teaches that the evaporation cell containing the EL material(s) are placed in a reaction chamber (163), with (a) shutter(s) (173) over the source of the evaporation cell(s) (col. 9, lines 15-37; Fig. 10).

'688 teaches opening and closing the shutter to form a light emitting layer on the substrate comprising the organic EL material (col. 9, lines 30-37).

Claims 3 and 4: '688 teaches that the shutters are opened and closed to perform "selective deposition" of the materials, including the EL material (col. 9, lines 30-33).

Claims 5-8: "688 teaches that more than one evaporation cell may be provided (Fig. 10; col. 9, lines 15-37).

Claims 13-16: The organic EL materials may include Alq<sub>3</sub>, a small molecule material (See Spec., p. 18, lines 3-6).

Claims 34-35 and 38: In evaporation, the deposited material travels directly from the source to the substrate.

5. Claims 9-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis '688 in view of Onitsuka '167 as applied to claims 1-4 above, and further in view of Rallison et al. (U.S. Patent 5,945,967, hereafter '967).

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'688 and '167 are discussed above. '688 teaches the use of EL devices to display photographic images (col. 2, lines 55-56), but it does not explicitly teach their use for video or digital camera displays.

'967 teaches that electroluminescent displays are suitable for forming video camera displays (col. 1, lines 13-30). The selection of a known material based on its suitability for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the EL device produced by the method of '688 and '167 as a video camera display with a reasonable expectation of success because '967 recognized the suitability of EL devices for video camera displays.

6. Claims 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis '688 in view of Onitsuka '167 as applied to claims 1-4 above, and further in view of Wadley et al. (U.S. Patent 5,534,314, hereafter '314).

'688 and '167 are discussed above. They teach that the evaporation takes place under vacuum conditions (i.e., below atmospheric pressure). They do not teach that the evaporation takes place at atmospheric pressure. Vacuum evaporation, as described by '688 and '167, is a physical vapor deposition (PVD) technique.

Wadley '314 teaches an evaporation method in which a crucible (i.e., an evaporation cell) is filled with an evaporation source and directed to the deposition substrate in the presence of an inert gas at up to atmospheric pressure (col. 5, lines 50-64; col. 11, lines 8-12). The electron beam treatment heats the evaporation material (col. 12, lines 42-49). Wadley '314 teaches that the technique offers better efficiency, less expensive equipment, and faster deposition rates than PVD, while avoiding the use of high vacuum (col. 1, lines 30-67; col. 4, lines 14-36). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the deposition method of '314 in place of the PVD methods of '688 and '167 in have received the benefits of higher efficiency, lower cost, faster deposition rate, and lower vacuum requirements.

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Claims 18-20: Wadley '314 is open to the use of other evaporant sources (col. 15, lines 15-25). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided multiple shuttered sources as taught by Antoniadis '688 in order to have provided the separate layers of the EL device (as discussed above).

7. Claims 21-24, 39, and 42-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis '688 in view of Onitsuka '167 as applied to claims 1-4 above, and further in view of Peng (U.S. Patent 6,495,198, hereafter '198).

'688 and '167 are discussed above. They do not explicitly teach moving the substrate and the source in relation to one another.

'198 teaches that moving the substrate and organic electroluminescent sources relative to one another in order to form blurred junctions and thereby improve the conductivity between layers (col. 3, lines 31-61; col. 5, lines 25-31). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have move the substrate and the depositional source relative to one another in order to have improved the conductivity between layers of the EL device of '688 by blurring the junction between the layers.

Claims 23-24 and 39: The evaporation cell may be moved during the deposition step (col. 4, lines 25-46).

Claims 42-43: The substrate may be moved horizontally (Fig. 3B).

8. Claims 21-22, 31-38, and 40-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis '688 in view of Onitsuka '167 as applied to claims 1-4 above, and further in view of Swanson (U.S. Patent 6,537,607, hereafter '607).

'688 and '167 are discussed above. They do not explicitly teach moving the substrate and the source in relation to one another nor patterning without using a mask.

'607 teaches moving the substrate and organic electroluminescent sources relative to one another in order to create striped areas of different colors (col. 5, lines 4-28). The patterns are formed without using a mask (col. 2, lines 14-27). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have move the substrate and the

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depositional source relative to one another without using a mask in order to have provided colored stripes in the device of '688.

Claims 31-33 and 41: The strips may be 500 (i.e., several hundred)-1000 microns wide (col. 5, lines 30-38). The port must have a diameter equal to or more than smaller than the strip width because diffusion of the materials will make the material expand after emission. Furthermore, the size of the port affects the pressure inside the cell. It has been held the discovery of optimum value of result effective variable in known process is ordinarily within skill of art. *In re Boesch and Slaney*, 205 USPQ 215 (CCPA 1980). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have optimized the diameter of deposition cell in order to have optimized the pressure within the effusion cell.

Claims 42-43: The substrate may be moved horizontally (Fig. 4).

9. Claims 23-24 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis '688 in view of Onitsuka '167 and Swanson '607 as applied to claims 21-22 and 38 above, and further in view of Nanto et al. (U.S. Patent 5,921,836, hereafter '836).

'688, '167, and '607 are discussed above. They do not explicitly teach moving the evaporation source. However, the selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07. '836 teaches that phosphor stripes may be applied to display panels by moving the deposition sources (Abstract). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have moved the cell instead of the substrate of '688 and '607 with a reasonable expectation of success and with the expectation of similar results because '836 teaches that moving the deposition source is a suitable method of applying stripes to a substrate.

10. Claims 25-28 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis '688 in view of Onitsuka '167 as applied to claims 1-4 above, and further in view of Eguchi et al. (U.S. Patent 4,672,265, hereafter '265).

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'688 and '167 are discussed above. They do not explicitly teach that the evaporation cell is made of tungsten. However, The selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07. '265 teaches that tungsten is an operative material for evaporation boats for electroluminescent materials (col. 11, lines 45-56). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used tungsten as the particular boat material of '688 with a reasonable expectation of success because '265 teaches that it is an operative boat material.

11. Claims 29-30 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis '688 in view of Onitsuka '167 and Swanson '607 as applied to claims 21-22 and 38 above, and further in view of Eguchi '265 for substantially the same reasons applied regarding claims 25-28.

12. Claims 44-47 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis '688 in view of Onitsuka '167 as applied to claims 1-4 and 38 above, and further in view of Utsugi et al. (U.S. Patent 6,294,892, hereafter '892).

'688 and '167 are discussed above, but do not explicitly teach that the pattern has a width of 50-200 microns. However, the examiner takes Official Notice that it is well known in the art of organic electroluminescent devices to use pixels which have widths in the claimed range. See, e.g., '892, col. 8, lines 42-52; col. 9, lines 62-65. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used such widths as the particular widths of deposition of '688 and '167 with a reasonable expectation of success because '892 teaches that such pixel dimensions are suitable for organic EL displays.

13. Claims 48-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis '688 in view of Onitsuka '167 and Peng '198 as applied to claims 21-22 above, and further in view of Utsugi '892 for substantially the same reasons applied regarding claims 44-47.



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14. Claims 48-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis '688 in view of Onitsuka '167 and Swanson '607 as applied to claims 21-22 and 38 above, and further in view of Utsugi '892 for substantially the same reasons applied regarding claims 44-47.

15. Claims 51-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis '688 in view of Onitsuka '167 and Peng '198 as applied to claims 21-22 above, and further in view of Wadley '314 for substantially the same reasons applied regarding claims 17-20.

16. Claims 51-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis '688 in view of Onitsuka '167 and Swanson '607 as applied to claims 21-22 above, and further in view of Wadley '314 for substantially the same reasons applied regarding claims 17-20.

17. Claim 53 is rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis '688 in view of Onitsuka '167, Peng '198, and Wadley '314 as applied to claims 51 above, and further in view of Rallison '967 for substantially the same reasons applied regarding claims 9-12.

18. Claim 53 is rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis '688 in view of Onitsuka '167, Swanson '607, and Wadley '314 as applied to claims 51 above, and further in view of Rallison '967 for substantially the same reasons applied regarding claims 9-12.

19. Claim 54 is rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis '688 in view of Onitsuka '167, Peng '198, and Wadley '314 as applied to claims 51 above, and further in view of Eguchi '265 for substantially the same reasons applied regarding claims 9-12.

20. Claim 54 is rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis '688 in view of Onitsuka '167, Swanson '607, and Wadley '314 as applied to claims 51 above, and further in view of Eguchi '265 for substantially the same reasons applied regarding claims 9-12.

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21. Claim 55 is rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis '688 in view of Onitsuka '167, Peng '198, and Wadley '314 as applied to claims 51 above, and further in view of Utsugi '892 for substantially the same reasons applied regarding claims 44-47.

22. Claim 55 is rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis '688 in view of Onitsuka '167, Swanson '607, and Wadley '314 as applied to claims 51 above, and further in view of Utsugi '892 for substantially the same reasons applied regarding claims 44-47.

### ***Response to Arguments***

23. Applicant's arguments filed 11/23/2005 have been fully considered but they are not persuasive.

Applicant argues that the Examiner has not provided motivation to replace the vacuum atmosphere of Antoniadis with the inert gas atmosphere of Onitsuka. The argument is unconvincing because no vacuum is complete. There must be a gas present in the system of Antoniadis. Antoniadis is silent as to the identity of that gas. Onitsuka clearly teaches why that gas should be an inert gas: to avoid degrading the organic EL materials.

Applicant argues that "Onitsuka only teaches that inert gas should be used in a step of carrying an organic EL multilayer structure or in a step of assembling a shield member." The argument is unconvincing because Applicant's statement is false. As has been repeatedly demonstrated by the examiner, the last sentence of the abstract explicitly states that the steps of forming layers on substrates to form organic EL multilayers are carried out in inert gas atmospheres. Col. 12, lines 31-67 teaches that the method of forming the layers is vacuum evaporation. Therefore, Onitsuka teaches vacuum deposition in an inert atmosphere.

Applicant argues that Onitsuka does not teach attaching an inert gas source directly or indirectly to its vacuum chambers. The argument is unconvincing because the hooking of a gas source to a chamber in which the gas is desired is a well known expedient in the chemical arts. The Examiner notes that Onitsuka expressly recognizes such an attachment in Fig. 4.

Applicant argues that Onitsuka's teaching to avoid degradation of the EL material in the presence of moisture would not have been recognized as applying to the atmosphere in the formation chamber. The argument is incorrect because it misrepresents the level of skill in the

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art. The suggestion that a material degrades in response to moisture is sufficient to notify one of ordinary skill in any chemical art to use an atmosphere without moisture. Inert gases are the most notoriously well known non-reactive gases because that is what “inert” means.

Accordingly, the teaching that a material degrades (reacts undesirably) in response to moisture is, by itself, sufficient to suggest the use of an inert gas to any practitioner of ordinary skill in any chemical art, particularly in the art of EL devices, and more particularly in the art of organic EL devices. However, Onitsuka does further and explicitly teaches that the use of an inert gas avoids such degradation and teaches that it should be present when forming the EL layers.

Applicant challenges the Examiner’s statement that Onitsuka’s teachings of other uses of inert gases is not germane to the rejection. The argument is unconvincing because Applicant has failed to explain why Applicant’s teaching in the Abstract that the steps of forming layers on substrates to form organic EL multilayer structures are carried out in inert gas atmosphere and the teachings of col. 12, lines 31-67 that the method of forming the layers is vacuum evaporation fails to demonstrate to one of ordinary skill in the art vacuum deposition in an inert atmosphere.

Applicant argues that by using an inert gas a film may be formed selectively without a mask. The argument is unconvincing because selective deposition without a mask is not claimed, and further because it is clear that the selective deposition results from the use of directed sources, not from the inert gas. Applicant’s arguments directed to mean free path suggest that a vacuum atmosphere would be optimum. Applicant’s arguments directed to unintended adhesion of impurities are unconvincing because such features are not claimed and furthermore because it is not an unexpected result. Purges of deposition chambers (vacuum or not) with inert gases is well known in the vapor deposition art to prevent contamination.

Applicant’s argument regarding the avoiding crystallization are unconvincing because they such features are not present in the claims, because the assertions are unsupported by evidence, and because the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

***Conclusion***


24. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

25. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Cleveland whose telephone number is (571) 272-1418. The examiner can normally be reached on Monday-Thursday, 7-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Michael Cleveland  
Primary Examiner  
Art Unit 1762

2/7/2006